CLAIMS

1. Method for determining the exchange surface A between a reagent (1) and the wall of a housing (2) containing this reagent, in order to determine in particular the power P_r of a thermal reaction inside the housing (2) and the thermal exchange coefficient U between the reagent (1) and the wall of the housing (2), characterized

in that it consists in:

- measuring a first heat flux F_1 per surface unit taken in a zone of the wall in secure contact with the reagent (1),

- measuring a second heat flux F_2 per surface unit taken in a zone of the wall in secure absence of contact with the reagent (1),

- measuring a third heat flux F_3 per surface unit taken in a zone of the wall comprising, in a continuously overlapping manner, both any zone of the wall in secure contact with the reagent (1) next to any zone of the wall in secure absence of contact with the reagent (1),

- calculating, proportionally between the measurements of the first, second, and third heat flux which have been carried out, the real level h of the reagent (1) inside the housing (2),

so that, from the real level h of the reagent (1) which has been calculated, and with respect to any given geometry of the housing (2), the real exchange surface A between the reagent (1) and the wall of the housing (2) containing this reagent (1) can be determined continuously and in real time.

2. Method according to claim 1, applied to the determination of the power P_t transmitted by the housing (2), characterized

in that it consists in:

- measuring the first heat flux F1 per surface unit,

- determining the said exchange surface A between the reagent (1) and the wall of the housing (2),

so that the power P_t transmitted by the housing (2) can be calculated, continuously and in real time, with a precision and a reliability obtained from those of the exchange surface A.

3. Method according to claim 2, applied to the determination of the thermal exchange coefficient U between the reagent (1) and the wall of the housing (2), characterized

in that it consists in:

- measuring the temperature T_r of the reagent (1) and the temperature T_e of the wall of the housing (2),

- determining the real exchange surface A between the reagent (1) and the wall of the housing (2),

- calculating the power P_t transmitted by the housing,

so that the thermal exchange coefficient A between the reagent (1) and the wall of the housing (2) can be calculated continuously and in real time, with a precision and a reliability obtained from those of the exchange surface A.

4. Method according to claim 2, applied to the determination of the power P_r of the reaction, characterized

in that it consists in:

- measuring the evolution of the temperature T_r of the reagent (1) as a function of the reaction time,

- determining the power P_t transmitted by the housing (2),

- estimating the thermal losses of the housing (2),

so that the power P_r of the reaction can be calculated, continuously and in real time, with a precision and a reliability obtained from those of the exchange surface A.

5. Method according to claim 1, applied to the measurement of the variation of the level h of a reagent (1) inside a housing (2), until a security threshold.

6. Device for measuring the exchange surface A between a reagent (1) and the wall of a housing (2) containing this reagent, for carrying out a method according to claim 1, characterized

in that it comprises:

- a housing (2) designed to receive the reagent (1),

- a first heat flux sensor (4) for measuring the first heat flux F_1 per surface unit, this heat flux sensor (4) being disposed on the external wall of the housing (2) in a zone opposed to its internal face, in secure contact with the reagent (1),

- a second heat flux sensor (5) for measuring the second heat flux F_2 per surface unit, this heat flux sensor (5) being disposed on the external wall of the housing (2) in a zone opposed to its internal face, in secure absence of contact with the reagent (1),

- a third heat flux sensor (6) for measuring the third heat flux F_3 per surface unit, this heat flux sensor (6) being disposed on the external wall of the housing (2) in a zone

opposed to its internal face, both in presence and in absence of contact with the reagent (1).

7. Device according to claim 6, characterized

in that it comprises first electronic means (12) for calculating the level h of the reagent (1) form logical tension data provided by the first, second, and third flux sensors (4,5,6), and second electronic means (13) for calculating the real exchange surface A between the reagent (1) and the wall of the housing (2).

8. Device according to claim 6 for carrying out a method according to any of claims 1 to 4, applied to a calorimeter, characterized:

in that it comprises an envelope (3) surrounding the housing (2) for the circulation of a fluid (17) around this housing (2), this fluid being thermostatted by means (18) for producing heat, so as to maintain the housing (2) at a desired temperature.

9. Device according to claim 8 for carrying out a method according to any of claims 3 and 4, characterized:

in that it comprises:

- a first temperature sensor (7) placed inside the housing (2) to measure the temperature T_r of the reagent,

- a second temperature sensor (8) placed inside the envelope (3) to measure the temperature T_e of the wall of the housing (2) from the temperature T_f of the thermostatted heat-exchanging fluid inside the envelope (3).

10. Device according to claim 9 for carrying out a method according to any of claims 2 and 3, characterized:

in that it comprises third electronic means (14) for calculating the power P_t transmitted by the housing (2) and fourth electronic means (15) for calculating the thermal exchange coefficient A between the reagent (1) and the wall of the housing (2), from the logical data provided by the second electronic calculation means (13) and from the logical data provided by the first (7) and second (8) temperature sensors.

11. Device according to claim 9 for carrying out a method according to claim 4, characterized:

in that it comprises fifth electronic means (16) for calculating the power P_r of the thermal reaction from the logical data provided by the third electronic calculation means (14) and by the first temperature sensor (7).

12. Device according to any of claims 6 and 7 for carrying out a method according to claim 5, characterized:

in that the first (4), second (5), and third (6) heat flux sensors constitute general means for determining continuously the level h of a reagent inside the housing (2), in association with the first calculation means (12).

13. Device according to claims 7, 10, and 11, characterized:

in that the first (12), second (13), third (14), fourth (15), and fifth (16) electronic calculation means are grouped in general memory and electronic calculation means (9).

14. Device according to claim 13, characterized:

in that it comprises a calculator comprising:

- general memory and electronic calculation means (9),
- means for displaying various measured and calculated logical data,

- means for capturing data and controlling the general memory and electronic calculation means (9).